PREDICT—A New Approach to Product Development

Los Alamos National Laboratory and Delphi Automotive Systems

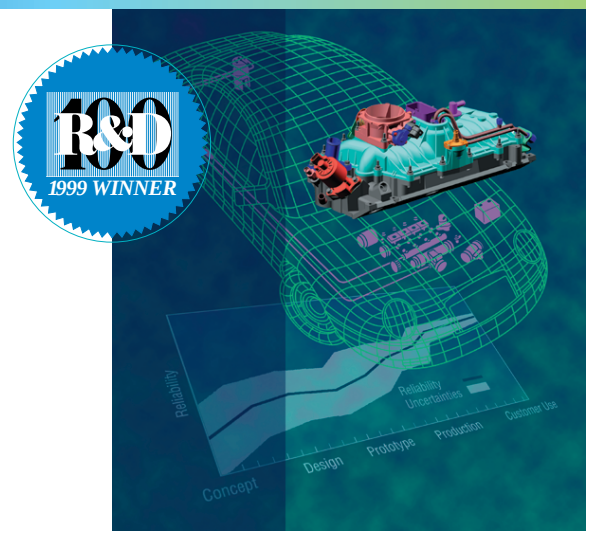
PREDICT (Performance and Reliability Evaluation with Diverse Information Combination and Tracking) is a method of estimating the performance or reliability of a product when test data are scarce or unavailable. PREDICT accomplishes this by (1) documenting and exploiting the expert knowledge of a company's designers, engineers, and scientists; (2) folding uncertainties about the product's expected performance into its calculations; and (3) mathematically combining expert knowledge and uncertainty with a wide variety of existing "hard" data. Hard data includes information such as performance results of similar products, test data from components of the product in question, and output from computer models of the product. PREDICT consists of customized training, a reference book, and sample tools (worksheets, mathematical formulas, computer codes) that users are taught to adapt to their particular situation.

Applications

PREDICT is designed to (1) estimate the performance of products while they are still concepts—early enough to provide guidance for design changes before the expense of prototyping; and (2) forecast the future performance of existing systems that cannot be tested but which must be guaranteed to perform as required when they are needed.

Applications in the fields of engineering and physical science include systems used in airplanes, ships, conventional weapons, power plants, space missions, space vehicles, oil platforms, computers, telecommunication equipment, semiconductors, and robotics.

Advancements in the PREDICT methodology may lead to medical and national security applications, such as forecasting the effectiveness of medical equipment, new drug treatments, artificial organs, and nuclear nonproliferation verification.



PREDICT is a set of formal, structured techniques for estimating the performance of a product when test data are sparse or nonexistent.

Benefits

For analytically predicting performance, PREDICT has the capability to

- capture and exploit a company's greatest asset—the expert knowledge of its employees;
- prevent costly manufacturing surprises and product recalls;
- provide guidance for prototype testing, resource allocation, and design and process changes;
- monitor product/system performance through changes;
- reveal and clarify interactions in the system; and
- develop a formal record of knowledge to guide future product development.

Availability of applications for commercial licensing

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